SCM
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FINAL

File

Smoky Canyon Mine

Pilot Study Work Plan and Sampling and Analysis Plan

Biological Selenium Removal Treatment Technology Fluidized Bed Bioreactor

Final – September 2014

Final Addendum 01 – July 2015

Prepared for:

Simplot

J.R. Simplot Company
Smoky Canyon Mine
1890 Smoky Canyon Mine Road
Afton, WY 83110

P.O. Box 912
1130 West Highway 30
Pocatello, ID 83204

Prepared by:

FORMATION ENVIRONMENTAL
2500 55th Street, Suite 200
Boulder, Colorado 80301

Wilkening, Matt

From: Fred Charles <fcharles@formationenv.com>
Sent: Thursday, August 06, 2015 9:25 AM
To: Kauffman, Mary E -FS
Cc: Monty Johnson (monty.johnson@simplot.com); Burl Ackerman (burl.ackerman@simplot.com); Witt, Jonathan (jonathan.witt@Simplot.com); Sandi Fisher ; Colleen O'Hara-Epperly (cepperly@blm.gov); kwright@shoshonebannocktribes.com; susanh@ida.net; Rick McCormick; Wayne Crowther (Wayne.Crowther@deq.idaho.gov); Brady Johnson (brady.johnson@deq.idaho.gov); Wilkening, Matt; Alan Prouty (alan.prouty@simplot.com) (alan.prouty@simplot.com)
Subject: Response to Agency General Comment 3 - Smoky Canyon draft RO/UF Skid Work Plan and SAP

Hello Mary. As requested in your comment letter (dated July 21, 2015), the following Simplot response to general comment 3 is provided below.

General Comment 3: As noted in several of the specific comments below, it doesn't seem practical that a 6-week study is sufficient time to provide adequate data to fulfill the stated data objectives. It would seem prudent to evaluate the available data at the end of 6 weeks to determine if the data objectives have been met or if the unit needs to continue operation.

Response: Comment noted. As suggested in this general comment, Simplot will evaluate the available data at the end of 6 weeks to determine if the data objectives have been met or if the unit needs to continue operation. The Work Plan/SAP will be revised to reflect this.

Please let Monty or me know if you have further questions on this.

Thanks,
Fred

From: Kauffman, Mary E -FS [mailto:mkauffman@fs.fed.us]
Sent: Tuesday, July 21, 2015 3:13 PM
To: Alan Prouty
Cc: Monty Johnson (monty.johnson@simplot.com); Fred Charles; Burl Ackerman (burl.ackerman@simplot.com); Witt, Jonathan (jonathan.witt@Simplot.com); Sandi Fisher ; Colleen O'Hara-Epperly (cepperly@blm.gov); Kelly Wright (kwright@shoshonebannocktribes.com); Susan Hanson ; Rick McCormick; Wayne Crowther (Wayne.Crowther@deq.idaho.gov); Brady Johnson (brady.johnson@deq.idaho.gov); Matt Wilkening
Subject: Agency comments Smoky Canyon draft RO/UF Skid Work Plan and SAP

Alan,

Please see attached. Hard copies will go out in today's mail. FYI, the comments requiring resolution ASAP were resolved earlier today via email from Jonathan Witt. The Forest Service also provided conditional approval today to start up the skid pilot study.

Mary E. Kauffman
Remedial Project Manager
Forest Service
Caribou-Targhee National Forest
p: 208-557-5779
c: 208-313-4469
mkauffman@fs.fed.us

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Idaho Falls, ID 83401

USDA United States Department of Agriculture
Forest Service
Caribou-Targhee National Forest HQ
1405 Hollipark Drive
Idaho Falls, ID 83401
208-529-1020
FAX: 208-557-5827

File Code: 2160
Date: September 22, 2015

UPS: 1ZE273430390282780

Alan Prouty
Vice President, Environmental & Regulatory Affairs
J.R. Simplot Company
P.O. Box 27, One Capital Center
999 W. Main St. Ste 1300
Boise, ID 83707

Dear Alan;

The Forest Service approves the draft *Smoky Canyon Mine Pilot Study Work Plan and Sampling and Analysis Plan, Biological Selenium Removal Treatment Technology, Fluidized Bed Bioreactor Final – September 2014, Addendum 03 – September 2015, Pilot Test Plan: Bioreactor Post Treatment with Oxidant Frontier Water Systems (August 26, 2015)*, as Final with no comments or revisions requested.

Please provide a Final cover page for Addendum 03 at your earliest convenience.

Sincerely,

MARY KAUFFMAN
Remedial Project Manager

cc: Monty Johnson, Simplot, Pocatello
Burl Ackerman, Simplot, Boise
Fred Charles, Formation Environmental, Boulder
Sandi Fisher, FWS, Pocatello
Colleen O'Hara-Epperly, BLM, Pocatello
Kelly Wright, Shoshone-Bannock Tribes, Fort Hall
Susan Hansen, Shoshone-Bannock Tribes, Fort Hall
Brady Johnson, DEQ, State Office
Wayne Crowther, DEQ, Pocatello
Matt Wilkening, EPA, Boise
Rick McCormick, CH2MHill, Boise

USDA United States Department of Agriculture
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File Code: 2160
Date: June 29, 2015

UPS: 1ZE273430393856628

Alan Prouty
Vice President, Environmental & Regulatory Affairs
J.R. Simplot Company
P.O. Box 27, One Capital Center
999 W. Main St. Ste 1300
Boise, ID 83707

Dear Alan;

Enclosed are the Agencies' comments on the Draft Smoky Canyon Mine Pilot Study Work Plan and Sampling and Analysis Plan, Biological Selenium Removal Treatment Technology, Fluidized Bed Bioreactor, Addendum 01, dated May 2015, received May 29, 2015. The Pilot Study Work Plan is a Deliverable under the 2009 Administrative Order on Consent/Consent Order for Performance of Remedial Investigation and Feasibility Study (RI/FS) for Smoky Canyon Mine under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

The Forest Service approves Addendum 01 as Final upon incorporation of the enclosed Agency comments. Please submit the Final Addendum 01 on or before July 30, 2015.

You may contact me at 208-313-4469 with any questions you may have regarding this matter

Sincerely,

MARY KAUFFMAN
Remedial Project Manager

Enclosure

cc: Monty Johnson, Simplot, Pocatello
Burl Ackerman, Simplot, Boise
Fred Charles, Formation Environmental, Boulder
Sandi Fisher, FWS, Pocatello
Colleen O'Hara-Epperly, BLM, Pocatello
Kelly Wright, Shoshone-Bannock Tribes, Fort Hall
Brady Johnson, DEQ, State Office
Wayne Crowther, DEQ, Pocatello
Matt Wilkening, EPA, Boise
Rick McCormick, CH2MHill, Boise

Agency Comments
Draft Smoky Canyon Mine Pilot Study Work Plan and Sampling and Analysis Plan,
Biological Selenium Removal Treatment Technology, Fluidized Bed Bioreactor
Addendum 01 – May 2015, received May 29, 2015

June 29, 2015

Mary E. Kauffman
USFS Remedial Project Manager, Smoky Canyon Mine

General Comments

The plan proposes potential increases of phosphorous to the receiving waters from <0.1 mg/L up to near 0.25 mg/L. There is little available information on potential phosphorous impacts to fisheries. The most notable potential impact would most likely be an increase in algae growth. This in turn, could impact water quality, food resources and decrease oxygen in the water, all of which could affect the fishery. The Agencies request that Simplot monitor for algae growth at the discharge to Hoopes Springs when they conduct their weekly sampling. Additionally, since algae growth has the potential to affect food resources (i.e., abundance of aquatic invertebrates), the Agencies request that baseline aquatic invertebrate surveying be conducted to monitor density and diversity of aquatic invertebrates immediately downstream of the effluent discharge, with additional surveying to be completed after week 12 of operation (or if unusual algae growth becomes apparent). The results of the aquatic invertebrate surveys are to be reported in the first available monthly or quarterly report after the data have been collected and validated.

The temperature change outlined in the Work Plan/SAP could have an impact on the fishery. Increasing temperature from 11 to 17°C (Table 2-3) in the effluent could be significant, especially if Hoopes Springs and S. Fork Sage Creek make up a significant portion of the flow in Sage Creek. IDEQ's Maximum Daily Average Temperature for cold water biota is 19°C. If Hoopes Spring and South Fork Sage makes up most of the flow for Sage Creek, the increase in those streams could result in temperatures that exceed 19°C below the confluence of Hoopes, S. Fork Sage and Sage Creeks. Additionally, it is assumed that discharge will occur 24-hours a day, eliminating daily fluctuations in temperature. Fish can survive in higher water temperatures during the hottest part of the day as long as temperatures drop at night; but if discharge is occurring 24-hours a day, a constant increase in temperature is more likely to impact fish. The Agencies request that in addition to monitoring temperature (and other field parameters) in Hoopes Spring and S. Fork Sage Creek below the effluent discharge, that field parameters also be monitored at the confluences of Hoopes/S. Fork Sage Creek and Sage Creek.

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CORPORATE – POCATELLO OFFICE

July 29, 2015

Mary Kauffman
USDA Forest Service – Caribou National Forest
1405 Hollipark Drive
Idaho Falls, Idaho 83401

Subject: **Smoky Canyon Mine Remedial Investigation/Feasibility Study (RI/FS)**
Final Addendum 01 – Final Pilot Study Work Plan and Sampling and Analysis Plan
Biological Selenium Removal Treatment Technology Fluidized Bed Bioreactor

Dear Mary:

Please find enclosed hard copies of Final Addendum 01 of the *Final Pilot Study Work Plan and Sampling and Analysis Plan, Biological Selenium Removal Treatment Technology Fluidized Bed Bioreactor*. This submittal provides revised monitoring analyte lists and schedules for the pilot study.

Final Work Plan/SAP Addendum 01 incorporates revisions in response to Agency comments (dated June 29, 2015) on the draft submittal (dated May 29, 2015), along with other related communication with the Agencies. Simplot responses to Agency comments are also provided in this submittal.

Along with this hardcopy submittal, a CD containing the Final Work Plan/SAP in its entirety is enclosed. Electronic files of this document can be downloaded at the following website:

https://smokyrifs.formationclient.com/
Username: (b) (6)
Password (case sensitive): (b) (6)

Please contact me if you have any questions.

Sincerely,

Monty Johnson
Environmental Engineering Manager

Enclosures

cc: Mary Kauffman - USDA Forest Service, 410 East Hooper, Soda Springs, ID 83276 (unbound)
James Alexander - USDA Office of the General Counsel (electronic files only)
Wayne Crowther - IDEQ, 444 Hospital Way, Suite 300, Pocatello, ID 83201
Brady Johnson - IDEQ, 1410 North Hilton, Boise, ID 83706
Colleen O'Hara-Epperly- BLM, 4350 South Cliffs Dr., Pocatello, ID 83204
Sandi Fisher- USFWS, 4425 Burley Dr., Suite A, Chubbuck, ID 83202
Matt Wilkening - USEPA, 950 West Bannock St., Suite 900, Boise, ID 83702
Ted Yackulic - USEPA, 1200 Sixth Avenue, Seattle, WA 98101 (electronic files only)
Kelly Wright - Shoshone-Bannock Tribes, P.O. Box 306, Fort Hall, ID 83203
Susan Hanson - (b) (6)
Gary Billman - IDL, 3563 East Ririe Highway, Idaho Falls, ID 83401
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Jeff Osterman - CH2M Hill, 322 East Front St., Suite 200, Boise, ID 83702
Doug Scott - CH2M Hill, 59 Lilac Court, Pagosa Springs, CP 81147 (electronic files only)
Alan Prouty - J.R. Simplot Company, P.O. Box 27, Boise, ID 83707
Burl Ackerman - J.R. Simplot Company, P.O. Box 27, Boise, ID 83707
Chad Gentry - J.R. Simplot Company, P.O. Box 1270, Afton, WY 83110
Andy Koulermos - Formation Environmental, 2500 55th St., Boulder, CO 80301

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Simplot Responses to Agency Comments (June 29, 2015) on "Draft Smoky Canyon Mine Pilot Study Work Plan/Sampling and Analysis Plan, Biological Selenium Removal Treatment Technology, Fluidized Bed Bioreactor, Addendum 01" (dated May 2015)

General Comments

The plan proposes potential increases of phosphorous to the receiving waters from <0.1 mg/L up to near 0.25 mg/L. There is little available information on potential phosphorous impacts to fisheries. The most notable potential impact would most likely be an increase in algae growth. This in turn, could impact water quality, food resources and decrease oxygen in the water, all of which could affect the fishery. The Agencies request that Simplot monitor for algae growth at the discharge to Hoopes Springs when they conduct their weekly sampling. Additionally, since algae growth has the potential to affect food resources (i.e., abundance of aquatic invertebrates), the Agencies request that baseline aquatic invertebrate surveying be conducted to monitor density and diversity of aquatic invertebrates immediately downstream of the effluent discharge, with additional surveying to be completed after week 12 of operation (or if unusual algae growth becomes apparent). The results of the aquatic invertebrate surveys are to be reported in the first available monthly or quarterly report after the data have been collected and validated.

Response: The comment doesn't appear to account for the dilution of pilot treatment effluent when it mixes with the much larger untreated flow in Hoopes Spring. If the phosphorus concentration in the effluent is at the estimated maximum of 0.25 mg/L (at 250 gpm) and is mixed with Hoopes Spring discharge untreated water with a phosphorus concentration of 0.01 mg/L (at average flow of 3,000 gpm), then the phosphorus concentration after mixing is calculated to be 0.028 mg/L. This calculated concentration is similar to phosphorus concentrations measured in areas with potential grazing effects including Sage Creek and Crow Creek and is well below TMDL target concentrations established for streams and rivers in the Western United States. Phosphorus concentrations are therefore predicted to be below any potential levels of concern for algae growth and Simplot believes that this issue does not warrant additional study for this pilot system.

However, to address this Agency comment, Simplot will compile and evaluate existing aquatic invertebrate density and diversity data for HS-3 (also show IDEQ Stream Macroinvertebrate Index [SMI] values), including data collected from 2006 to 2008 and in 2010 and at other times. This pre-water treatment dataset could be viewed as "baseline" or "pre-water treatment". In addition, aquatic invertebrate data will be collected at HS-3 in mid to late August 2015. After identifying the species and conducting other reviews of the August data, the new data will be compared with previous data to characterize aquatic invertebrate density and diversity with time. With this information, other evaluations may be considered which may include data collection next year, if warranted. The additional aquatic invertebrate data collection planned for August 2015 is discussed in new Section 6.8, and a discussion on the data evaluation has been added to Section 7.1.

The temperature change outlined in the Work Plan/SAP could have an impact on the fishery. Increasing temperature from 11 to 17°C (Table 2-3) in the effluent could be significant, especially if Hoopes Springs and S. Fork Sage Creek make up a significant portion of the flow in Sage Creek. IDEQ's Maximum Daily Average Temperature for cold water biota is 19°C. If Hoopes Spring and South Fork Sage makes up most of the flow for Sage Creek, the increase in those streams could result in temperatures that exceed 19°C below the confluence of Hoopes, S. Fork Sage and Sage Creeks. Additionally, it is assumed that discharge will occur 24-hours a day, eliminating daily fluctuations in temperature. Fish can survive in higher water temperatures during the hottest part of the day as long as temperatures drop at night; but if discharge is occurring 24-hours a day, a constant increase in temperature is more likely to impact fish. The Agencies request that in addition to monitoring temperature (and other field parameters) in Hoopes Spring and S. Fork Sage Creek below the effluent discharge, that field parameters also be monitored at the confluences of Hoopes/S. Fork Sage Creek and Sage Creek.

Response: Again, the comment appears to not account for mixing of the effluent with untreated portion of Hoopes Spring. An increase in effluent temperature of 6 °C would result in an increase of 0.5 °C in the receiving stream (6x250/3000). Similar to the phosphorus comment, Simplot believes that this increase would be below levels that could affect fish populations and that additional study is not warranted for this pilot system.

However, to address this Agency comment, Simplot will compile and evaluate stream temperature data collected continuously at the following locations: HS-3 (downstream from Hoopes), LSV-2c (Sage Creek downstream from the Hoopes inflow), and LSS (SF Sage Creek). Continuous temperature data are available at HS-3 and LSV-2c, which have been logging temperatures September to November 2014 and April 2015 to present. At the LSS flume, temperature data have also been logged continuously from 2009 to present. These datasets will provide diurnal temperature data, including maximum and minimum temperatures downstream from Hoopes (HS-3), downstream of Hoopes flow in Sage Creek (LSV-2c), and on South Fork Sage Creek uninfluenced by Hoopes (LSS). After this initial evaluation, temperature data will be downloaded at these locations every two to three months for regular review of temperature trends and evaluation of potential effects of the pilot study on fish. These additional temperature data compilation and evaluation activities have been added to the discussion in Section 7.1.

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CORPORATE – POCATELLO OFFICE

March 5, 2015

Mary Kauffman
USDA Forest Service – Caribou National Forest
1405 Hollipark Drive
Idaho Falls, Idaho 83401

Subject: **Smoky Canyon Mine Remedial Investigation/Feasibility Study (RI/FS)
Replacement Pages, Final Pilot Study Work Plan and Sampling and Analysis Plan
Biological Selenium Removal Treatment Technology Fluidized Bed Bioreactor**

Dear Mary:

Please find enclosed hard copies of replacement pages for the *Final Pilot Study Work Plan and Sampling and Analysis Plan, Biological Selenium Removal Treatment Technology Fluidized Bed Bioreactor*. This submittal incorporates corrections and clarifications to the document based on recent preparation for initiation of treatment system operation and data collection.

Along with this hardcopy of the replacement pages, a CD containing the Final Work Plan/SAP in its entirety (with replacement pages incorporated) is enclosed. Electronic files of this document can be downloaded at the following website:

https://smokyrifs.formationclient.com/
Username: (b) (6)
Password (case sensitive): (b) (6)

Please contact me if you have any questions.

Sincerely,

Monty Johnson
Environmental Engineering Manager

Enclosures

cc: Mary Kauffman - USDA Forest Service, 410 East Hooper, Soda Springs, ID 83276 (unbound)
James Alexander - USDA Office of the General Counsel (electronic files only)
Wayne Crowther - IDEQ, 444 Hospital Way, Suite 300, Pocatello, ID 83201
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Alan Prouty - J.R. Simplot Company, P.O. Box 27, Boise, ID 83707
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Andy Koulermos - Formation Environmental, 2500 55th St., Boulder, CO 80301

Flow adjustment, system-optimization monitoring, and maintenance operations will continue throughout the duration of the Pilot Study.

3.3.2 Pilot Unit Monitoring

Monitoring of water streams conducted in the Pilot Study will include continuous monitoring of flow, pressure, temperature, pH, ORP, and DO using in-line measurement probes and then recorded via a wireless connection to a laptop computer. These data will provide the information needed to optimize the treatment system's operation and performance.

In addition, periodic sample collection and analysis will occur as described in Table 3-3. Samples may also be collected more frequently as necessary to characterize changes in performance due to system adjustments. The analyses and methods are shown in Table 3-4 and Table 3-5.

Table 3-3. Pilot Study Monitoring, Sampling, and Analysis Schedule

System Status	Sampling Frequency	Sampling Locations	Analyses to be Performed	Lab Turnaround Time
Initial Steady State Flow After Start Up (week 0)	One-time	Influent, effluent FBR effluent	Full analytical suite[a]	Routine
Operational (weeks 2-6)	Every two weeks	Influent, effluent	Full analytical suite[a]	Routine
Operational (weeks 2-6)	Every two weeks	Influent, effluent	Focused analyte suite[b]	48 hours[c]
Operational (after week 6)	Every two weeks	Influent, effluent	Focused analyte suite[b]	48 hours[c]
Operational (after week 6)	Quarterly	Influent, effluent	Full analytical suite[a]	Routine
Operational – Immediately Prior to Shut Down	One-time	Influent, effluent FBR effluent	Full analytical suite[a]	Routine

Notes:
a – Refer to Table 3-4 for list of analyses and methods.
b – Refer to Table 3-5 for list of analyses and methods.
c – Data will be available in 4-5 days after sample collection depending on shipping logistics.

Table 3-4. Laboratory Analyses, Methods and Reporting Limits – Full Analytical Suite

Laboratory Analyses	Method	Reporting Limit (RL)[1] (mg/L)
Alkalinity, as CaCO3	SM 2320B	1
Aluminum, total and dissolved	EPA 6010C	0.1
Ammonia as N	SM 4500 NH3 G	0.03
Antimony, total and dissolved	EPA 6020A	0.003
Arsenic, total and dissolved	EPA 6020A	0.003
Barium, total and dissolved	EPA 6020A	0.001
Beryllium, total and dissolved	EPA 6020A	0.0002
Biological Oxygen Demand	EPA 405.1	2
Boron, total and dissolved	EPA 6020A	0.05
Cadmium, total and dissolved	EPA 6020A	0.0002
Calcium, dissolved	EPA 6020A	0.05
Chemical Oxygen Demand	EPA 410.4	5
Chloride	EPA 300.0	0.2
Chromium, total and dissolved	EPA 6020A	0.0015
Cobalt, total and dissolved	EPA 6020A	0.001
Copper, total and dissolved	EPA 6020A	0.001
Fluoride	EPA 300.0	0.1
Hardness	SM 2340B (by calculation)	0.1
Iron, total and dissolved	EPA 6010C	0.06
Lead, total and dissolved	EPA 6020A	0.003
Magnesium, dissolved	EPA 6010C	0.10
Manganese, total and dissolved	EPA 6020A	0.001
Mercury, total and dissolved	EPA 7470A	0.0002
Molybdenum, total and dissolved	EPA 6020A	0.001
Nickel, total and dissolved	EPA 6020A	0.001
Nitrate+Nitrite as N	EPA 353.2	0.05
Nitrate, as N	EPA 300.0	0.05
Total Phosphorus	SM 4500 PE	0.01
Potassium, dissolved	EPA 6010C	0.5
Selenium, total and dissolved	EPA 6020A	0.003
Selenate and selenite, dissolved	IC-ICP-DRC-MS	0.003 and 0.003
Organic selenium species (dimethyl selenide and dimethyl diselenide)	HPLC-ICP-DRC-MS	0.001 and 0.0015
Silver, total and dissolved	EPA 6020A	0.0001
Sodium, dissolved	EPA 6010C	0.5
Sulfate	EPA 300.0	1.0
Thallium, total and dissolved	EPA 6020A	0.001
TDS	SM 2540C	10
TOC	SM 5310B	1

Laboratory Analyses	Method	Reporting Limit (RL)[1] (mg/L)
TSS	SM 2540D	5
Uranium, total and dissolved	EPA 6020A	0.001
Vanadium, total and dissolved	EPA 6020A	0.0015
Zinc, total and dissolved	EPA 6020A	0.005

[1] Each laboratory's MDLs and RLs may change over time.

Table 3-5. Laboratory Analyses, Methods and Reporting Limits – Focused Analytical Suite (Routine Samples)

Laboratory Analyses	Method	Reporting Limits (RL)[1] (mg/L)
Routine Monitoring Parameters		
Selenium, dissolved	EPA 6020A	0.003
Selenium, total	EPA 6020A	0.003
Nitrate, as N	EPA 300.0	0.05

In order to accurately reflect actual operational parameters, all sample collection activities will be conducted when the system is running under stable operating conditions. In addition, samples may be collected during unstable conditions for optimization/troubleshooting. The full analytical suite (**Table 3-4**) includes all of the RI COPCs and other parameters needed to evaluate the operation of the system. The focused analytical suite provides additional data for tracking selenium and nitrate concentrations over time. Sample preservation and holding times will be addressed as specified in Table 3-6. Section 6.0 describes these sampling and analysis activities in greater detail, and identifies individual laboratories performing analyses and specific turnaround times. Together, Section 6.0 of this plan and the Quality Assurance Project Plan (QAPP), which is included in the Smoky Canyon Mine RI/FS Sampling and Analysis Plan (Formation 2010b), shall serve as the main reference for field and laboratory personnel conducting this work.

Table 3-6. Sample Preservation and Holding Times

Analyte	Preservation and Storage [1]	Holding Time (days unless otherwise specified)
Total metals (excluding mercury), Hardness	HNO_3 to pH < 2, Cool at 4°C ± 2°C	180
Total mercury	HNO_3 to pH < 2, Cool at 4°C ± 2°C	28
Dissolved metals (excluding mercury), Hardness	Field filter; HNO_3 to pH < 2, Cool at 4°C ± 2°C	180
Dissolved mercury	Field filter; HNO_3 to pH < 2, Cool at 4°C ± 2°C	28
Ammonia, Total Phosphorus, Nitrate+Nitrite, COD	H_2SO_4 to pH < 2, Cool at 4°C ± 2°C	28
TOC	H_2SO_4 to pH < 2 (amber glass vial), Cool at 4°C ± 2°C	28
BOD	Cool at 4°C ± 2°C	2
Chloride, Fluoride, Sulfate	Cool at 4°C ± 2°C	28
Alkalinity	Cool at 4°C ± 2°C	14
TDS, TSS	Cool at 4°C ± 2°C	7
Nitrate, as N	Cool at 4°C ± 2°C	2
Dissolved selenite, selenate	Field filter; Cool at 4°C ± 2°C	2 or as soon as practical

[1] Sufficient ice shall be included in the shipping containers to ensure that samples arrive at the laboratory within the appropriate temperature range.

3.4 Investigation-Derived Waste Management and Demobilization

The investigation-derived waste (IDW) generated by the Pilot Study will be:

1) The substrate from the fluidized bed stage;
2) The used filter media; and
3) The dewatered backwash from the filtration stage.

These materials will be sampled and analyzed using toxicity characteristic leaching procedure (TCLP) consistent with the procedures described in Section 6.2.3. Simplot will be responsible for disposal of IDW during and at the end of the study.

Additional IDW may include disposable sampling equipment, personal protective equipment, decontamination water, and spent calibration solution. All disposable sampling materials and personal protective equipment, such as disposable spoons, gloves, and other items used in sample processing, will be disposed as regular municipal solid waste at a Subtitle D Landfill.

6.3.2 Sample Identification and Labeling

Samples will be assigned unique sample identification numbers. These numbers are required for tracking the handling, analysis, and reporting status of all samples collected during monitoring. Each sample identification number will identify the sampling location and type of sample. Sample identification numbers will be assigned using several codes as follows.

The first field in the identification number identifies the Site and general time period. For example, samples collected during the Smoky Canyon Mine Pilot Study in July 2014 will all have the prefix "SPS[07][14]".

The second field in the identification number identifies the location of the sample. For this Pilot Study, this second field will be "LSS-N".

The third field identifies the sample matrix type and includes a digit describing the intended sample use. The matrix types are defined as:

IN: Influent;

BE: Bioreactor Effluent; and

EF: System Effluent.

The fourth fields are sample use codes and include:

0 – Primary sample;

2 – Field duplicate sample;

3 – Equipment rinsate or QA/QC blank sample; and

4 – Split primary sample.

Note that additional codes may be added as the project proceeds. The additions will be communicated immediately to the field staff, data management team, and project chemist.

The last field is a three-digit number unique to the specific sample. Numbers will begin with 01 and increase consecutively as sampling tasks are implemented. For example:

- SC0814-LSSHS-IN003, is a primary water sample collected from the inlet in August 2014 with the sequential number 3;
- SC0914-LSSHS-EF202, is a field duplicate water sample collected from the treated effluent in September 2014 with the sequential number 2; and
- SC0814-LSSHS-IN403, is a split of the primary water sample collected from the influent in August 2014 with the sequential number 3.

Each sample that is collected in the field will be labeled for future identification. Sample labels will be filled out as completely as possible by a member of the sampling team. All sample labels

- Number of containers for each sample;
- Sample preservation;
- Sampler's signature and affiliation;
- Signature of persons relinquishing custody, dates, and times;
- Signature of persons accepting custody, dates, and times;
- Method of shipment;
- Shipping air bill number (if the samples are shipped);
- Condition of samples and cooler temperature upon receipt by laboratory; and
- Any additional instructions to the laboratory.

6.4 Data Quality Indicators

The DQIs for data collected in support of the Pilot Study are accuracy, precision, completeness, representativeness, and comparability. The DQI control limits and acceptance criteria for data collected during the Pilot Study are provided in the QAPP (Formation 2010b). Table 6-1 presents a summary of the project DQIs.

Table 6-1. Laboratory Quality Control Acceptance Criteria

<table>
<tr><th rowspan="2">Laboratory Measurement</th><th rowspan="2">Method</th><th rowspan="2">RL (mg/L)</th><th colspan="2">Data Quality Indicators</th></tr>
<tr><th>Accuracy Measures and Control Limits</th><th>Precision Measures and Control Limits</th></tr>
<tr><td colspan="5">Metals/Metalloids/Inorganics</td></tr>
<tr><td>Aluminum</td><td>6010C</td><td>0.1</td><td rowspan="3">LCS Recovery:
80% to 120%</td><td rowspan="3">MS/MSD[1]:
RPD < 20%</td></tr>
<tr><td>Antimony</td><td>6020A</td><td>0.003</td></tr>
<tr><td>Arsenic</td><td>6020A</td><td>0.003</td></tr>
<tr><td>Barium</td><td>6020A</td><td>0.001</td><td rowspan="4">MS Recovery[1]:
75% to 125%

Post Digestion Spike:
85% to 115%</td><td rowspan="2">Analytical Duplicate:
RPD < 20%</td></tr>
<tr><td>Beryllium</td><td>6020A</td><td>0.0002</td></tr>
<tr><td>Boron</td><td>6020A</td><td>0.05</td><td rowspan="4">Field Duplicate:
RPD < 20%</td></tr>
<tr><td>Cadmium</td><td>6020A</td><td>0.0002</td></tr>
<tr><td>Chromium</td><td>6020A</td><td>0.0015</td><td rowspan="2">ICV Recovery:
90% to 110% (6010C, 6020A)
80% to 120% (7470A)</td></tr>
<tr><td>Calcium</td><td>6010C</td><td>0.05</td></tr>
<tr><td>Cobalt</td><td>6020A</td><td>0.001</td><td rowspan="3">CCV Recovery:
90% to 110% (6010C, 6020A)
80% to 120% (7470A)</td><td rowspan="6"></td></tr>
<tr><td>Copper</td><td>6020A</td><td>0.001</td></tr>
<tr><td>Iron</td><td>6010C</td><td>0.1</td></tr>
<tr><td>Lead</td><td>6020A</td><td>0.003</td><td rowspan="2">Method Blanks:
Less than RL [CRQL]</td></tr>
<tr><td>Magnesium</td><td>6010C</td><td>0.1</td></tr>
<tr><td>Manganese</td><td>6020A</td><td>0.001</td><td rowspan="3">Interference Check Sample:
80% - 120%</td></tr>
<tr><td>Mercury</td><td>7470A</td><td>0.0002</td></tr>
<tr><td>Molybdenum</td><td>6020A</td><td>0.001</td></tr>
<tr><td>Nickel</td><td>6020A</td><td>0.001</td><td></td></tr>
</table>

Laboratory Measurement	Method	RL (mg/L)	Data Quality Indicators	
			Accuracy Measures and Control Limits	Precision Measures and Control Limits
Potassium	6010C	0.5	**Interference Check Sample:** 80% - 120%	
Selenium	6020A	0.003		
Silver	6020A	0.0001	**Internal Standard Recovery:** 60% to 125%	
Sodium	6010C	0.5		
Thallium	6020A	0.001		
Uranium	6020A	0.001	**Serial Dilution:** <10% Difference	
Vanadium	6020A	0.0015		
Zinc	6020A	0.005		

6.5 Quality Assurance and Quality Control

The QAPP (Formation 2010b) presents QA/QC policies and procedures developed to ensure that the data collected in the field and analyzed by the laboratory are of appropriate quality to meet project objectives. Certain deviations from the procedures specified by the QAPP are appropriate for data intended to evaluate the performance of the treatment system. These deviations are identified and explained below.

6.5.1 Field Quality Control Samples

The field QC practices will consist of the collection of QC samples, decontamination of field sampling equipment, and adherence to SOPs. These elements are described below.

Equipment rinsates/field blank samples and field duplicate samples will be collected to evaluate the accuracy and reproducibility of the field sampling methods. Data collected in the field may lack reproducibility due to natural variability and/or the field sampling methods. One duplicate and one equipment blank sample for every 20 primary samples will be collected to evaluate the reproducibility of field sampling methods, and assess any influence from sample equipment and sample containers. Field duplicates are useful in documenting combined field and laboratory precision.

Field Duplicates

Field duplicates are collected to measure the combined sampling and analytical variability associated with the sample results. Duplicate samples are usually collected simultaneously with or immediately after the corresponding original samples have been collected, depending on the sample type and medium and consistent with detailed instructions in the relevant SOPs for sample collection. In all cases, the same sampling protocol is used to collect the original sample and the field duplicate sample. The field duplicate is analyzed for the same suite of analytical

that all the requested analyses were performed along with the correct methodologies and detection limits.

Complete raw data packages from the laboratory will be evaluated to assess compliance with DQIs. Data will also be evaluated to assess whether the measurement performance criteria for accuracy and precision have been achieved. The laboratory will provide a QC summary suitable for this level of review.

Data review will include but will not be limited to:

- Reviewing COC forms and laboratory data sheets to verify that samples were analyzed within specified holding times. Samples which do not satisfy holding time and preservation requirements will be noted and the reliability of the data assessed.
- Reviewing whether the calibration requirements were met.
- Evaluating the accuracy of chemical data using results from laboratory control samples (LCSs) and matrix spike (MS) samples prepared by the laboratory. The laboratory will calculate the percent recoveries for these results. If the recoveries are outside the limits presented in this plan, action will be taken by the laboratory to improve the precision of analytical results.
- Evaluating the precision of the chemical data by comparing original and duplicate sample results. The laboratory will calculate RPD values for the laboratory duplicate samples. If RPD values are outside the limits presented in this plan, action will be taken by the laboratory to improve the precision of the analytical results.
- Reviewing all of the data for potential transcription errors, detection limit discrepancies (laboratory only), data omissions, and suspect or anomalous values. If such errors or deficiencies are found, the laboratory and/or field sampler will be contacted and the appropriate corrective action taken.

The data will be evaluated and compared against the measurement performance criteria, and the data's usability with respect to addressing the Pilot Study objectives will be determined. Adherence to field and laboratory protocols will be reviewed. All field and laboratory data will be summarized in tables, and any trends and relationships evaluated and presented to determine if the data provides strong evidence for a particular action.

6.7 Data Management

The analytical laboratories will report data to the following recipients:

Monty Johnson, J.R. Simplot Company, Project Manager (monty.johnson@simplot.com) – electronic data deliverables

Jonathan Witt, J.R. Simplot Company, Project Technical Manager (jonathan.witt@simplot.com) – electronic data deliverables

Karen Schneider, Formation (kschneider@formationenv.com) – hard copy and electronic data deliverables

Tim Pickett, Frontier Water Systems (timpickett@frontierwater.com) – electronic data deliverables

Mary Kauffman, USFS, (mkauffman@fs.fed.us) – electronic data deliverables.

Deliverables will be sent to the USFS at the same time as they are sent to other recipients.

Paper laboratory reports and associated field documentation will be filed, and the electronic data will be stored in a computer database maintained by Formation. Final entry of the information into the database will not be completed until the data review described above in Section 6.6 is completed, and it is determined that the data reported from the field and laboratory are complete.

USDA United States Department of Agriculture
Forest Service
Caribou-Targhee National Forest HQ
1405 Hollipark Drive
Idaho Falls, ID 83401
208-529-1020
FAX: 208-557-5827

File Code: 2160
Date: July 21, 2015

UPS: 1ZE273430391904767

Alan Prouty
Vice President, Environmental & Regulatory Affairs
J.R Simplot Company
P.O. Box 27, One Capital Center
999 W. Main St. Ste 1300
Boise, ID 83707

Dear Alan,

Enclosed are Agency comments on the Draft Smoky Canyon Mine Pilot Study Work Plan (WP) and Sampling and Analysis Plan (SAP) for Reverse Osmosis/Ultrafiltration (RO/UF) and Biological Selenium Removal Fluidized Bed Bioreactor Treatment Technology, dated July 8, 2015.

Please provide written resolution to comments #35 a) and b) as soon as possible. The Forest Service will provide conditional approval for start-up of the RO/UF pilot study upon receipt of these responses.

Please provide written resolution to General Comment #3 within two weeks of receipt of this letter and attached comments.

The above requested written resolutions can be submitted via email.

Please provide a revised draft WP/SAP for the RO/UF on or before August 22, 2015, incorporating the attached Agency comments.

Sincerely,

/S/ Mary Kauffman
MARY KAUFFMAN
Remedial Project Manager

Enclosure

Cc: Monty Johnson, Simplot, Pocatello
Jonathan Witt, Simplot, Boise
Burl Ackerman, Simplot, Boise

Fred Charles, Formation Environmental, Boulder
Sandi Fisher, Fish and Wildlife Service, Pocatello
Jeremy Moore, Fish and Wildlife Service, Pocatello
Wayne Crowther, DEQ, Pocatello
Brady Johnson, DEQ, Pocatello
Colleen O'Hara-Epperly, BLM, Pocatello
Matt Wilkening, EPA, Boise
Kelly Wright, Shoshone-Bannock Tribes, Fort Hall
Susan Hanson, Shoshone-Bannock Tribes, Pocatello
Rick McCormick, CH2MHill, Boise

Agency Comments *Draft Smoky Canyon Mine Pilot Study Work Plan and Sampling and Analysis Plan for Reverse Osmosis/Ultrafiltration and Biological Selenium Removal Fluidized Bed Bioreactor Treatment Technology*, dated July 8, 2015

July 21, 2015

Mary E. Kauffman
USFS Remedial Project Manager, Smoky Canyon Mine

UF/RO-FBR Workplan and Sampling and Analysis Plan (WP and SAP) (Simplot, 2015)

General Comment

1) There is a good introduction but the WP mainly relies on referring to the other two documents (Appendix A and B); thus, it really doesn't function as a stand-alone WP or SAP. In addition, the WP doesn't have a simple flow diagram of the whole process. The UF/RO study has a flow diagram that barely shows the FBR (and doesn't call it that) while the FBR study shows the RO Break tank at the start of the process and nothing behind it. Please provide a single diagram that shows the entire train.

2) The start date of July 15th, will need to be revised pending final approval for start-up.

3) As noted in several of the specific comments below, it doesn't seem practical that a 6-week study is sufficient time to provide adequate data to fulfill the stated data objectives. It would seem prudent to evaluate the available data at the end of 6 weeks to determine if the data objectives have been met or if the unit needs to continue operation.

Specific Comments

4) **Section 2.2, page 5, 1st sentence.** What is meant by "conceptual"? Please define.

5) **Section 2.2, page 5, 2nd sentence.** A 1/100 scale is referenced. The math would suggest that total flow at build out would be 25,000 gpm at the springs. Please explain or correct.

6) **Section 2.2, page 5, 4th bullet.** Please define the other COPCs.

7) **Section 3.2, page 6.** 19 gpm/24 gpm implies ~79% recovery. This seems to disagree with the UF/RO Work Plan, which states in Section 4.3.2 that the design RO recovery is 75%. Please revise accordingly.

8) **Section 4.1.1, page 8.** Checking instrument calibration once per week, as stated, may not be adequate to ensure accurate data collection. More frequent calibration checks are recommended (e.g., daily for some instruments), especially given the relatively short duration of the pilot test (6 weeks). Please revise.

Appendix A-UF/RO Work Plan (RSCI, 2015)

9) **Section 2.1, page 4, bullet list.** It seems that 6 weeks is a very short time frame in which to evaluate UF/RO system chemical usage, and cleaning and replacement requirements. Please clarify.

10) **Section 2.2, page 5, 1st sentence.** Feed water is described as coming from Sage Creek and Hoopes Spring. Please clarify if Sage Creek is correct, if it comes from SF Sage Creek Springs.

11) **Section 3.4, page 7, last paragraph cites Tables 3.1 and 3.2.**
    a. It does not appear that these tables were included, nor are they listed in the List of Tables in the Table of Contents.
    b. Also, "Sage Creek/Hoopes Springs" is again mentioned as influent source – see previous comment.

12) **Section 3.6, page 8, Table 3.3.** Please define "CF".

13) **Section 4.2, page 11, 2nd sentence.** Confusing wording – "These water quality treatment goals...will be sampled..." The goals won't be sampled; rather, the process water will be sampled and analyzed to determine if the goals are met. Please revise.

14) **Section 4.2, page 12, Table 4.1.** Please define all new abbreviations, e.g., in table footnotes.

15) **Section 4.2, page 12, paragraph after Table 4.1, 1st sentence.** This is poor wording. Please clarify what 98% Se removal at the end of 3-year service really is – for instance, clarify if this is a performance guarantee.

16) **Section 4.3, page 12, 2nd paragraph.** Please further explain how items (1) and (2) will be evaluated in a 6-week study given that CIP is not expected to be needed until 3-6 months of operation.

17) **Section 4.3, page 12, last paragraph.** Please define abbreviation "gfd". Also, should be consistent in capitalizing this or not.

18) **Section 4.3.1, page 13, 2nd paragraph.** Please define "TMP".

19) **Section 4.3.2, page 13, 2nd paragraph.** Again, it is not clear how these long-term goals will be evaluated in a 6-week study. Please explain how the data will be used for this.

20) **Section 4.4, page 13, 1st paragraph.** Please explain how spent cleaning solutions production and characteristics can be assessed when no CIP events are expected to be needed within the study duration.

21) **Section 4.5, page 14, 1st and 2nd paragraphs.** Please provide more explanation to allow the reader to understand it. Also, define "LRV".

22) **Section 4.6, page 14.** Again, it seems that a 6-week study is not enough time to fulfill the stated data objectives.

23) **Section 4.7.3, page 17, last paragraph.** Reference to Table 4.2 appears to be in error. Please revise.

24) **Section 4.8, page 19, 2nd paragraph.** Reference to Table 4.3 appears to be in error. Please revise.

Appendix B-FBR Work Plan (Frontier, 2015)

25) Recommend a brief introduction with a system overview and process description. For instance, the words fluidized bed reactor, bioreactor, etc. do not even appear on the title sheet nor in Section 1 of the text.

26) Recommend referencing all tables and figures in the text and provide a discussion of what they present. This is lacking throughout the document and is hard to follow.

27) **Section 1.1, page 5, Table 1.3.** This table would be more useful if it indicated the location(s) where each on-line parameter is monitored. Please revise.

28) **Section 1.2, page 5, 1st sentence.** Please revise to give reader some indication of what MicroC4400 contains. The parenthetical "nutrient" is ambiguous and potentially misleading, because the reader might think it means inorganic nutrients whereas it is presumably organic (electron donor source).

29) **Section 3, page 9, 1st paragraph.** Cites 8-week study, while the other two documents say 6 weeks (should explain). Also, the text mentions "...work plan objectives...section 3". Please explain what this is referring too. Similarly, please define (provide citation for) the Sampling and Analysis Plan referenced in the third bullet.

30) **Section 4.1, page 9, 1st paragraph.** Word missing in 3rd sentence – recommend something like "when", "once", or "after". The 6th sentence should explain seeding procedure, e.g., how

microbes will be introduced, what quantity and product, and how long it should be allowed to "soak". Please revise.

31) **Section 4.2, page 10, 1st paragraph.** Please explain how steady-state operation is defined/determined.

32) **Section 4.2, page 10, objective 1.** Recommend listing the target constituents and their treatment objectives. (Table 5.2 lists some MDLs but not treatment targets.) Please revise.

33) **Section 4.2, page 10, objectives 2-4.** Again, it does not seem practical to evaluate bed scaling potential, and effects of anti-scalant within a 6-week study. Please explain further.

34) **Section 4.2, page 10, objective 4.** Please revise objective. Unclear what this means – needs better explanation.

35) **Section 5, page 12, Table 5.2.**
    a. It appears that other parameters are missing from this table that should be analyzed in final effluent, such as ammonia and TKN, BOD, TSS, sulfide, metals, and selenium speciation. These parameters are important for evaluating discharge acceptability/treatment performance.
    b. It is recommended to include some lab analysis of field-measured parameters as a check on accuracy (QC is often somewhat lax when using test kits in the field).
    c. The TP MDL is shown as 0.05 mg/L, compared to the target effluent value of 0.01 mg/L cited in Table 4.1 of the UF/RO Work Plan. Please revise for consistency.

References

J.R. Simplot. 2015. Smoky Canyon mine, Pilot Study Work Plan and Sampling and Analysis Plan, Reverse Osmosis/ultrafiltration and biological Selenium Removal Fluidized Bed bioreactor Treatment Technology, Draft. July 8, 2015.

RSCI. 2015. UF/RO Skid Treatability Study Pilot Test Work Plan, Rev 2, June 26, 2015.
Frontier Water Systems. Pilot installation and Operation Plan, Rev 1. June 23, 2015.